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ABSTRACT

A sample of 524 Israeli school children in grades 4 through 8 was used to investigate the relationships of game-playing with school achievement, family background, and several psychological characteristics. Game playing was found not to be directly related to school achievement when abilities and attitudes were controlled. However, the playing of certain types of games was found to be related to certain attitudes and abilities, which in turn were related to school achievement. These relationships were nonlinear and appeared to represent threshold effects. (Author)

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GILI SCHILD

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ABSTRACT

A sample of 524 Israeli school children was used to investigate the relationships of game-playing with school achievement, family background, and several psychological variables. Game-playing was found not to be directly related to school achievement when abilities and attitudes were controlled. However, the playing of certain types of games was found to be related to certain attitudes and abilities which in turn were related to school achievement. These relationships were nonlinear and appeared to represent threshold effects.

INTRODUCTION

The main activity of children, when they interact, is playing games. This activity should therefore have some influence on children's achievements, psychological abilities and attitudes, as has been pointed out by Coleman (1961) and Inbar (1970). The problem raised in this study concerns they way, if any, in which game-playing affects academic achievement.[1]

The first possibility to be considered is that playing games might affect academic achievement directly. Children may generalize directly from games to life, applying strategies they learn in games to situations outside the games.

The second possibility is that games might affect one or more of the psychological abilities or attitudes which, in turn, influence achievement in school. A specific example of the effect on ability is suggested by Inbar (1970): " . . . the average span of attention required by the games a child plays might be related to his later ability to focus his attention . . . ." As for attitudes, their importance for academic achievement has been well established. Coleman (1966)--referring to the student's interest in school and his reported pursuit of reading outside school, his self-concept or self-esteem, and his sense of control of the environment--stated that: "Of all variables measured in this survey, including all measures of family background and all school variables, these attitudes showed the strongest relation to achievement . . . . "

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[1]The current interest in the use of planned gaming as an educational device makes this question particularly relevant. (See Boocock and Schild, 1968.)

If games are the main activity for young children, then games must affect children's abilities and attitudes. But it would be unreasonable to assume that all games have the same effects. Games differ from one another in their structure and in the skills they require. Some games require physical skills; some require intellectual skills; some require both types of skills; and some (games of pure chance) require neither. Games which require mainly physical skills should lead to the development of different abilities (and possibly different attitudes) from those developed by intellectual games.

On the other hand, the effects on children of game-activity in general cannot be neglected. Some important abilities or attitudes may be developed by any kind of game-playing, simply because games produce a high involvement in children. Similarly, game-playing implies peer-interaction, with all its attendant consequences. Thus game-activity per se is included in this study as a variable in its own right.

Game-activity, whether physical, intellectual, or general has several dimensions. One could measure time spent, or number of different games played, or expressed liking for games, etc. In the present study the number of different games played was chosen as a measure of game-activity. Technical as well as substantive reasons led to this choice: technical, because of the difficulty in getting valid estimates of time spent and in finding clear behavioral referents for "liking" as expressed in questionnaire responses; and substantive, because of the context of academic achievement. We are concerned with the contribution --direct and indirect--of game activity to learning in school. It is

generally held by psychologists that a crucial factor in complex learning is "learning to learn," which is a function of the number of different learning situations to which the learner has been exposed (Harlow, 1951). Thus, what we know from the psychology of learning leads us to expect that intense preoccupation with a single game would produce little generalization to other tasks, while experience with several games would facilitate generalization. Following this line of reasoning, the present study included three game variables: (1) the total number of games played by the child, (2) the number of physical games played by the child, and (3) the number of intellectual games played by the child.[2]

Several abilities and attitudes were selected which might affect academic achievements and in turn be affected by gaming. The most obvious psychological characteristic in this context is intelligence. It is well known that IQ is a major factor in determining academic achievements. But IQ can be affected by teaching,[3] and there are also reports on the effect of gaming on IQ.[4] The other characteristics investigated in this study were sense of control of environment, self-concept (or self-esteem), creativity, cooperativeness, concentration, legitimation of authority, need for achievement, intentionality, attitude toward rules, delay of gratification, and stereotype of "good student."

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[2]See in the appendix the games retained for analysis in the present study.

[3]See Anastasi (1968)

[4]See Allen (1970)

METHOD

The study took place in April and May of 1968. The subjects were 524 Israeli school children, ages 9 through 13 (grades 4 through 8) in three schools in a middle-sized town. The three schools were chosen to represent three different socioeconomic levels. Data were collected by means of questionnaires which the subjects filled out in class.

The dependent variable of interest in this study was school achievement. For this purpose a composite variable was constructed from the student's grades in arithmetic and in language skills.

IQ was measured by the vocabulary subtest of the IQ test for elementary school children used by the Department of Education at the Hebrew University. The vocabulary subtest was selected because, of the several subtests, it has the highest correlation with the whole test.

Two tests for sense of control were used. The first test consisted of four attitude items. Three of these asked which is more important--hard work or luck--for success in games, in school, and in life. The fourth item asked whether the child believed that "There is a reason for what happens" or "It is a matter of luck." The second test consisted of two unfinished stories for which the child was to indicate which of two possible endings he preferred. One ending emphasized control, the other emphasized luck.

The test for self-esteem was taken from Rosenberg (1963) and adapted to suit the study requirements. Ten sentences were given, out of which

five expressed a positive attitude toward one's self, and five expressed a negative attitude. For each sentence the children were asked to "agree strongly," "agree," "disagree," or "disagree strongly."

Creativity was measured by a test adapted from E. D. Torrance's creativity development program (Torrance, 1963). The children were presented with two pages with circles on them and were asked to draw all the round-shaped things they could think of in five minutes. They scored one point for each legitimate round figure they drew.

The test for cooperativeness was adapted from Sawyer (1966). Two situations were described--a classroom situation and a "life" situation. For each, the child was asked to check among five alternatives how he would behave in such a situation. The alternatives ranged from perfect cooperation to noncooperation.

Concentration was measured by a test which, like the IQ test, is used by the Department of Education at the Hebrew University. A page with small drawings of different figures was given. Under each figure was an empty square. The task was to follow directions such as: "Draw an x in the empty square under every key which is next to a flower." The test is highly speeded.

Legitimation of authority was tested by requiring the child to state whether he strongly agreed, agreed, disagreed, or strongly disagreed that he ought to obey each of four persons: one whom he likes, one who knows much, one who can punish and reward, and one who is entitled to give orders. These items correspond to the "bases of power" by French and Raven (1968).

Need for achievement was measured by asking the children to choose which kind of question they would like to be asked--a very difficult question, a difficult question, an average question, an easy question, or a very easy question. They were told that if they would subsequently answer the question incorrectly, they would get an F. If their answer would be correct they would get a mark of "Excellent," "Very good," "Good," Fair," or "Poor"--according to the difficulty of the question chosen.

In the test for intentionality, a short story was presented. In the story two acts performed by two children were described: one act carried out by child A with good intentions but deplorable results, and the other act by child B with bad intentions but no harmful results. The question asked which of the two children was the nicer one.

Attitude toward rules was tested by asking whether the rules of a game may be changed and, if so, under what conditions. Possible answers were "never," "if the one who suggested the game agrees," and "if all the players agree."

Delay of gratification was measured by asking the children whether they preferred to have a small quantity of a desired good today or a larger quantity of it tomorrow.

Stereotype of "good student" was measured by giving the children a list of six traits and having them check the traits which they felt were characteristic of each of three roles: good boy, good player, and good student. The traits were these: good-looking, moral, smart, quick, lucky, and agressitve.

Several background variables were also recorded. These included age, sex, order of birth (oldest, middle, or youngest), and father's occupation. Because a substantial number of the children were not native-born Israelis, each child's place of birth was also recorded, as were his father's place of birth and the number of years since the father arrived in Israel.

RESULTS

The zero-order correlations between school achievement and the psychological variables are presented in Table 1.

Table 1

Zero-Order Correlations between Psychological Variables and School Grades

n = 524

Independent variables	Grade in language skills	Grade in arithmetic
I.Q.	.59	.52
Self-esteem	.23	.24
Creativity	.31	.31
Control (success in life)	.16	.08
Control (story)	.09	.05
Cooperativeness	.11	.13
Concentration	.25	.25
Legitimation of authority (like)	-.02	.005
Legitimation of authority (know)	.14	.16
Legitimation of authority (punish)	-.06	-.01
Legitimation of authority (reward)	-.13	-.09
Legitimation of authority (order)	.14	.13
Need for achievement	-23	-.23
Intentionality	-.03	-.09
Attitude toward rules	.11	.08
Delay of gratification	-.05	-.006
Stereotype of "good student":		
good looking	-.17	.11
moral	.21	.10
smart	.32	.26
quick	.001	-.007
lucky	-.05	-.06
aggressive	-.04	-.08

A comment is appropriate on the measure of need for achievement. Doubts were raised from the beginning about the validity of this item. The present data, which show a strong negative correlation with achievement, make it clear that whatever the item measured, it was definitely not need for achievement. Consequently, the item was excluded from further analysis.

On the basis of the size of the correlations shown in Table 1, four variables were retained for further study: I.Q., self-esteem, creativity, and concentration. In addition, control (success in life) was retained because of its importance in the social-psychological literature. Stereotype of "good student" was not retained because it added almost nothing to the multiple correlation of these variables with school achievement.

The multiple correlation of these five psychological variables with the composit dependent variable of school grades is .510. Adding the game variables increases the multiple correlation only to .516. Thus the game variables do not account for any variation in school grades that is not already accounted for by the psychological variables. We can now answer the first question posed in the introduction: "Given a student's psychological traits, do the games he plays affect his school achievement directly?" The answer is clearly "No."

We then turn to the second major question: "Does game-playing influence a student's psychological traits which in turn influence his school achievement?" In this analysis it is desirable to control statis-

tically for the effects of family background, since the addition of the background variables to the psychological variables raises the multiple correlation with school grades from .510 to .625.

The data were analyzed by means of a multiple regression analysis, using dummy variables based on the division of the scores into quartiles. (For the details of this analysis, see Schild, 1970.) Three main game variables were used: the total number of games the student played, the number of physical games he played, and the number of intellectual games he played. A qualitative summary of the regression analysis is presented in Table 2 below:

Table 2

Relationship between Number of Games Played and Selected Psychological Variables, Controlling for Family Background

Variables	Physical games	Intellectual games
I.Q.	none	none
Sense of control	strong positive	weak positive
Creativity	none	weak positive
Concentration	none	weak positive
Self-esteem	none	none

(Because of the dummy-variable technique used in the analysis, the relationships cannot be represented each by a single regression coefficient.)

Many of the relationships in Table 2 were not even approximately linear, but seemed instead to represent threshold effects. The relation-

ships involving sense of control were of this type. On the basis of these results, we can say that game-playing is related to some psychological variables which are related to school achievement.

Another regression analysis of the same type was used to assess the effects of the background variables on game participation. The only background variable which yielded significant effects was sex; boys play more physical games and more intellectual games than girls. The zero-order correlations between sex and number of games played are .331 for physical games and .129 for intellectual games.

DISCUSSION

The problem raised in this study concerns the way, if any, in which game-playing affects school achievement.

The first possibility considered was that games might affect achievement directly, even when psychological abilities and attitudes are given. For those aspects of gaming considered in the present study, the answer is "no." The frequency with which students play games of intellectual skill and games of physical skill is unrelated to their achievement in school, when their abilities and attitudes are constant.

The second possibility was that games might affect one or more of the psychological characteristics which, in turn, influence achievement in school. In this case the answer is less clear. The data do not permit such a conclusion for I.Q., which is the most important psychological determinant of achievement, or for the less important characteristics of creativity and self-esteem. They do, however, point to a strong effect of playing games of physical skill on sense of control, which in turn was found to be in the Coleman study an important characteristic affecting achievement. There is also a weaker indication of the effect of intellectual games on control, concentration, and creativity.

The question may be raised whether the causal relationship may not be in the opposite direction: that children with a strong sense of control choose to play games of physical skill. This is not indicated by the data. It was noted above that there is a marked effect of sex on playing games of physical skill and of these games on control. On the

other hand, the relationship between sex and control is weak zero-order correlation = .031). The hypothesized causal chain "sex ⟶ games ⟶ control" is thus more plausible than that of "sex ⟶ control ⟶ games."

It should not be overlooked that the effects concerned--of games on control and of control on school grades--are not strong in absolute terms. Thus the control-mediated effect of games on grades is quite weak. But the size of this effect is not the important question. The issue is whether there is any mechanism by which gaming may affect achievement in school, and here the answer is positive. How to exploit this mechanism and strengthen the effect--i.e., by encouraging play of control-inducing games--is another matter. The assertion that such a mechanism exists is also supported by the data on intellectual games, concentration, and creativity. Here the effects are even weaker, but their existence supports the argument that games may influence attitudes and abilities which determine school achievement.

Why should the effects have been weaker for intellectual games than for physical games? One possible reason is that the list of intellectual games included some games in which chance plays a considerable part. (Two examples are Backgammon and Monopoly.) It may be, then, that an important characteristic of games in determining their psychological effects, especially on children's sense of control, is the presence or absence of chance.

The findings of this study have some important implications for further research on the educational and psychological effects of children's games. First, there is not much point in investigating games on the basis of the total number played. The total number of games played had little relationship to any of the psychological variables investigated here, but when two subsets of games were considered separetely, some clear effects emerged. This result suggests that it may be important to develop more refined systems for classifying games and to use these systems in further studies on the effects of game-playing.

Second, the relationships between game-playing and psychological variables and of psychological variables in school achievement are not likely to be even approximately linear. Apparently, if a child plays a sufficient number of games of a certain type, it does not matter how many more games of that type he plays. It would seem that a theory concerning the impact of games must refer to a concept of "thresholds."

APPENDIX

Classification of Games Used for Analysis in This Study

"Physical" Games

1. Wrestling
2. Marbles
3. Jumprope
4. "Hitting with the Ball"
5. "New Donkey"
6. Soccer
7. Basketball
8. Dodge Ball
9. Ping-pong
10. Ropes
11. Gym or bars
12. High and long jump
13. Cock-fight
14. Ball passing with the head
15. Catch

"Intellectual" Games

1. Domino
2. Checkers
3. Quiz
4. Monopoly
5. Patience
6. Naval Battle
7. Foursomes
8. Chess
9. Backgammon
10. Crosswords

REFERENCES

Allen, L.; Allen, R.; and Ross, J. "The virtues of nonsimulation games." Simulation and Games, 1970, 1(3), 319-326.

Anastasi, A. Differential Psychology. New York: Macmillan, 1968.

Boocock, S. S. and Schild, E. O. Simulation Games in Learning. Beverly Hills, California: Sage Publications, 1968.

Coleman, J. S. The Adolescent Society. New York: Free Press, 1961.

Coleman, J. S., et al. Equality of Educational Opportunity. Washington, D.C.: U.S. Government Printing Office, 1966.

French, J. and Raven, B. "Bases of social power," in Group Dynamics, D. Cartwright and A. Zander (eds.) N.Y.: Harper & Row, 1968, pp. 259-268.

Harlow, H. F. "Thinking" in Theoretical Foundations of Psychology, H. Helson (ed.), New York: Van Nostrand, 1951.

Inbar, M. "Toward a sociology of autotelic behavior." La Critica Sociologica. Summer, 1970, V. 14.

Neumeyer, M. H. and Neumeyer, E. A. Leisure and Recreation. New York: Ronald Press, 1958.

Sawyer, J. "The altruism scale." American Journal of Sociology, 1966, 71(4) (pages not given)

Schild, G. "The influence of games, relative to abilities and attitudes on achievement in school." Unpublished master's thesis, The Johns Hopkins University, Baltimore, Maryland, 1970.

Torrance, G. T. Rewarding Creative Behavior. Englewood Cliffs, New Jersey: Prentice-Hall, 1965.